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JANUARY 4 1988

CHEMICAL & ENGINEERING

NEWS

Pressure builds on Carbide in Bhopal litigation
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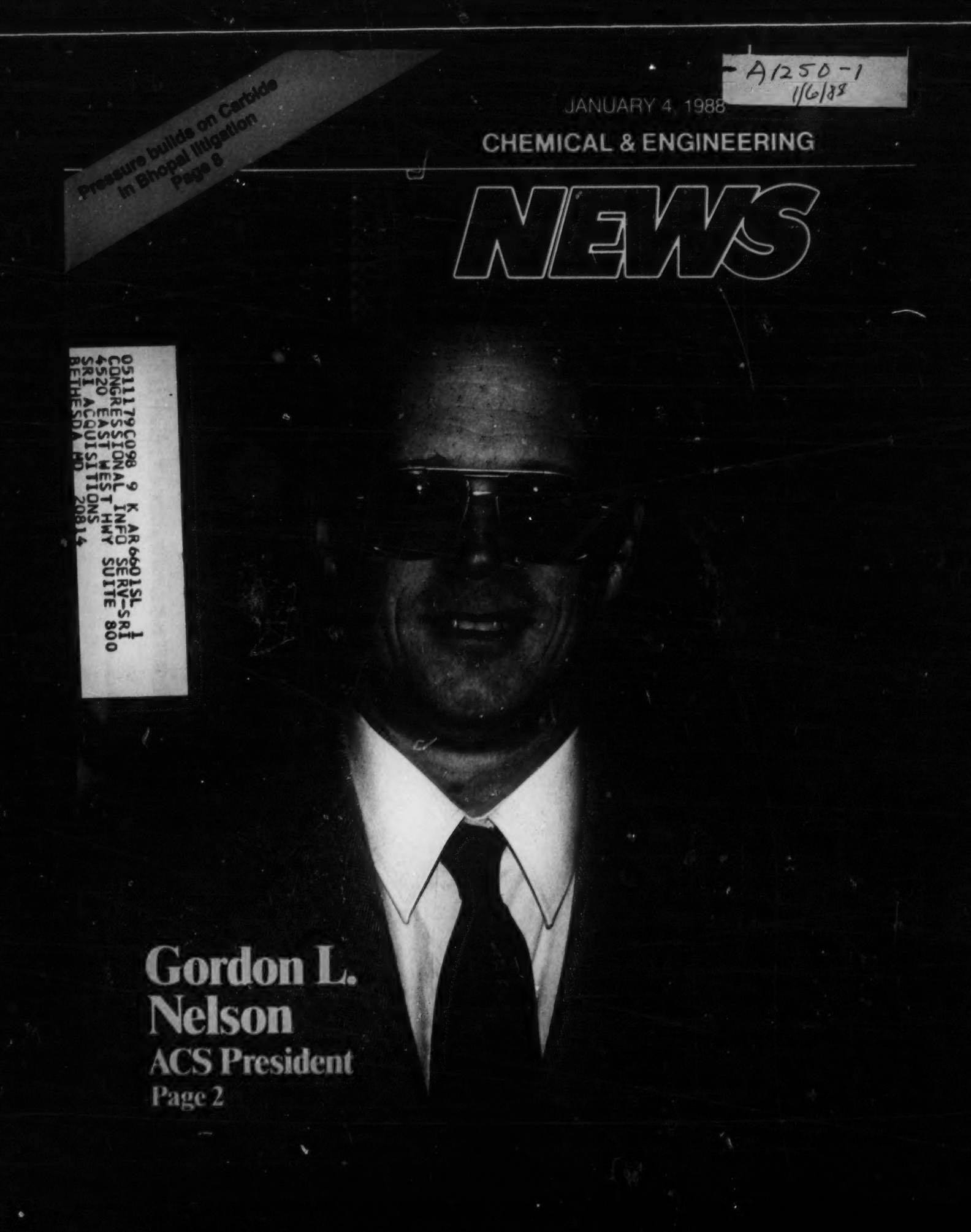

Gordon L. Nelson
ACS President
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CHEMICAL & ENGINEERING
NEWS

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JANUARY 4, 1988

News of the Week

■ **Of R&D agencies, NSF is one of those hard hit by the fiscal 1988 budget agreement worked out by Congress and the White House in December.** **Page 6**

■ **Biochemical defect that causes Duchenne muscular dystrophy, the most common and deadly form of the disease, has been identified.** **Page 7**

■ **Beleaguered pharmaceutical firm A. H. Robins receives two new merger bids and Rorer sweetens its existing agreement with Robins.** **Page 7**

Business

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Environmental priorities of Superfund skewed by EPA management's bureaucratic goals, Office of Technology Assessment official tells Senate subcommittee. **Page 17**

"Key technologies for the 1990s"—a national program that would involve a cooperative effort by industry, government, and academia—aims to return technological leadership to U.S. **Page 18**

Science

Initial research into sequence-specific DNA recognition reveals that synthetic molecules can recognize specific DNA sequences up to 15 base pairs in length. **Page 20**

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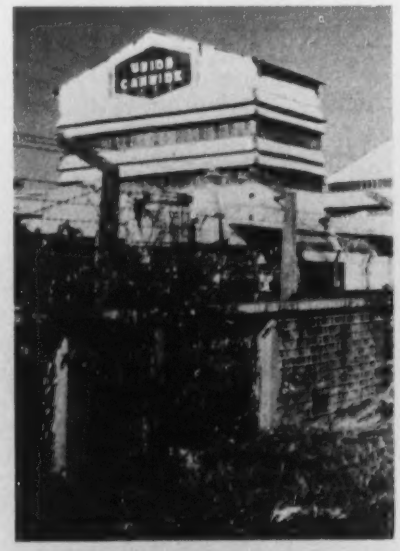
ACS News

Chairmen for several major ACS committees were selected at the board of directors' meeting in Columbus, Ohio, last month. **Page 31**

Cover: Photo by C&EN's Ernest L. Carpenter



News Focus

Three-year battle between Union Carbide and Indian government over liability and compensation in December 1984 gas leak disaster in Bhopal enters critical phase as Carbide faces key decisions on criminal trial, $270 million interim relief order. **Page 8**

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LETTERS

CHEMICAL SAFETY

Explosion involving 3-amino-5-methyl isoxazole

SIR: Recently in a fine chemicals factory a drum containing about 100 kg of 3-amino-5-methyl isoxazole exploded. The product was prepared from 3-carboxyamido-5-methyl isoxazole with sodium hypochlorite (Hofmann reaction). After extraction with dichloromethane and distillation of the solvent, the product was transferred as a melt at 70 to 80 °C in two 200-L drums. After about two hours one of the drums exploded.

The same sequence of operations had been previously run several times without any accident. To find the cause of the accident this institute has studied the thermal stability of the product.

Samples from the batch involved in the accident have shown a differential scanning calorimetry purity of 96%, samples from previous batches 98%. Thin-layer chromatography analysis has shown the presence of the isomer 5-amino-3-methyl isoxazole as main impurity.

Thermal stability tests in the adiabatic calorimeter ARC have shown the fundamental role played by the impurities in the accident. In fact, samples taken from the batch involved in the accident decompose exothermally at 62 °C; samples from previous batches decompose at 106 °C. A reagent grade sample (Fluka, purity 99%) decomposes at 140 °C.

The decomposition of all the samples involves a substantial evolution of heat (about 1800 joules per g) and of gases.

The accident can be clearly attributed to the exothermic decomposition of 3-amino-5-methyl isoxazole transferred as a melt at 70 to 80 °C, containing amounts of impurity higher than in previous batches. The self-accelerating heat evolution and the rate of pressure increase from gases in quasi-adiabatic conditions caused the burst of the drum.

Paolo Cardillo
Stazione Sperimentale per i Combustibili
Milan, Italy

Building more barriers

SIR: Lots of chemists these days—including some who write letters to C&EN—derive good clean fun from complaining how little chemistry is appreciated by the press and public. Certainly chemistry has some special problems, but part of its status just reflects the public's poor general scientific literacy.

No doubt about it; science can be tough to put across, and the areas furthest from everyday experience are the toughest, so one might suppose scientists would be anxious to remove unnecessary obstacles. It seems odd to me, then, that they are busy building more barriers by taking experientially named, self-explanatory scientific units and giving them new honorific names, which convey nothing at all to the uninitiated. This is called jargon.

Put yourself, if you can, in the place of that "man in the street," who has, perhaps, some modest smattering of science, and compare what is conveyed to you by the following: cycle ~~per~~ second vs. hertz; centigrade vs. Celsius; atomic mass unit vs. dalton; millimeters (of mercury) vs. torr(icelli).

With the greatest respect for those whose names are being appropriated, I really object to honorific changes of this sort. They seem noble, but they are not like issuing a commemorative stamp: Something important is being lost. If you are going to collude in and accept this kind of stuff, please don't come to me with sob stories about how the public doesn't understand you.

Hugh W. Thompson
Professor of Chemistry
Rutgers University

B.S. and M.S. chemists

SIR: I am sorry that Horst Kehl (C&EN, Nov. 2, 1987, page 2) was insulted by the report (C&EN, Sept. 28, 1987, page 24) of my remarks at the recent ACS symposium on Ph.D. education in chemistry. I surely had no intention of offending him or the thousands of professional M.S., B.S., and B.A. chemists.

The problem is largely, I think, one of the context of my remarks; I was talking specifically about the initiation and direction of chemical research programs, especially in colleges and universities, where the research experience of a Ph.D. is an important factor for success. There are also many other worthy professional careers in chemistry, as Kehl points out. With the image of the chemistry profession under fire in the world at large, we cannot afford to be divided by misunderstandings. I apologize to the many fine M.S. and B.S. chemists who may have been offended by the report of my remarks. A subsequent paper in the *Journal of Chemical Education* will clarify my views.

Jerry R. Mohrig
Northfield, Minn.

FEDERAL R&D BUDGET: Among agencies, NSF fares poorly

The National Science Foundation appears to be the civilian research agency hardest hit by the fiscal 1988 budget agreement worked out in late December between Congress and the White House on reducing the federal deficit.

The Administration had requested an 18% funding increase for NSF last January and committed itself to doubling NSF's budget over five years. The Senate had approved the full amount. The House had allowed a smaller, but still significant, increase. Then the stock market crashed in October, leading to the deficit reduction agreement.

On paper, NSF will get a 6%, $95 million increase to $1.7 billion in fiscal 1988. Funding for science education will be up 40% to $139 million. However, funding for research and related activities, which is where the grant money comes from, will be up only 3% to $1.5 billion. Once the money that Congress has earmarked for various programs and the Congressionally mandated 2% pay raise for federal personnel is subtracted from that amount, NSF will be left with 2 to 2.5% less money available for distributing grants than it had in fiscal 1987, according to NSF controller Sandra Toye.

No decision has yet been made on how the funds will be allocated to the various divisions, including chemistry. But there will almost certainly be a decline in the number of grants, as NSF tries to keep the amount of support provided by each grant from falling below the critical level. Also at question is what will happen to the new science and technology centers program. NSF has already received more than 700 letters of intent from institutions that say they will be applying for grants. It will take some time to peer review that number of proposals, so one possibility is delaying awards into the next fiscal year, which will start on Oct. 1. That, of course, depends on NSF's getting a bigger increase for fiscal 1989 than it did in fiscal 1988. NSF director Erich Bloch will be making the decisions on the S&T centers and division funding over the next few weeks.

In contrast, the Department of Energy's energy R&D programs fared very well in fiscal 1988, with funding up by over 30% to $3.2 billion. Within that overall total, funding for basic energy sciences is up 20% to $564.6 million. Funding for chemical sciences is set at $130.6 million and that for materials sciences at $172.5 million. Funding for fossil energy R&D is up 10% to $327 million, while funding for general science and research, which includes high energy and nuclear physics is up 12% to $804.5 million.

The National Institutes of Health will get an 8%, $480 million increase to $6.7 billion. That's 18% more than the Administration had requested last January. However, all but $32 million of that increase is earmarked for research on acquired immune deficiency syndrome (AIDS), leaving the rest of the NIH budget with a less than 1% increase. This could mean a decline in the number of new and competing research grants that NIH can fund in fiscal 1988, a goal the Administration has been trying to reach for some time.

Congress has more than doubled funding for AIDS programs in fiscal 1988, providing a total of $932 million. In addition to the NIH research programs, the Centers for Disease Control will get $305 million for education and prevention programs, and the Alcohol, Drug Abuse & Mental Health Administration will get $112 million for, among other things, development of programs to slow the spread of the disease through use of infected needles. Another $25 million is designated for the Food & Drug Administration, which must approve AIDS treatments, and $11 million for training of health care professionals.

R&D budgets: most up slightly in tight budget year

$ Millions	1988 Congressional appropriation	1988 Administration request	1987	% change 1987–88
DOD RDT&E	**$37,067.3**	**$43,719.0**	**$36,945.0**	**0%**
NIH	**6,670.7**	**5,612.8**	**6,190.7**	**8**
DOE	**4,714.2**	**4,430.6**	**3,882.7**	**21**
Energy	3,247.3	2,954.2	2,505.5	31
Defense	1,466.9	1,476.4	1,377.2	1
NASA	**3,274.2**	**3,651.2**	**3,127.7**	**5**
NSF	**1,717.0**	**1,892.5**	**1,622.1**	**6**
Research & related activities	1,453.0	1,634.5	1,406.1	3
Science education	139.2	115.0	99.0	41
Antarctic programs	124.8	143.0	117.0	7
Commerce	**1,255.0**	**1,151.9**	**1,168.0**	**7**
NOAA	1,110.0	1,013.3	1,044.6	6
NBS	145.0	138.6	123.4	18
USDA	**979.9**	**917.6**	**971.5**	**1**
EPA[a]	**186.4**	**187.6**	**202.5**	**−8**
TOTAL	**$55,864.7**	**$61,563.2**	**$52,168.1**	**7%**

a Does not include in-house R&D activities. Source: *Congressional Record*

Research funding for the National Aeronautics & Space Administration will be up 5% to $3.3 billion. The Administration had requested a 17% increase. Hardest hit of the NASA programs is the space station. Congress cut its funding request almost in half, allowing only $425 million in fiscal 1988. This troubles Sen. Howell T. Heflin (D.-Ala.), who says that "if we allow the space station of the U.S. to be killed, it will not be long before the entire space program of the U.S. will fall also."

The Department of Defense's R&D budget, after growing substantially for the past several years, is essentially flat in fiscal 1988. Congress held the research, development, testing, and evaluation budget to a mere $122 million, 0.3% increase. The Adminstration had requested an 18% increase. And the Administration's $5.8 billion funding request for the Strategic Defense Initiative was cut back to $3.9 billion.

Janice Long, Washington

Key protein absent in muscular dystrophy

Molecular biologists have found the biochemical defect responsible for the most common and deadly form of muscular dystrophy. The discovery of a protein that is missing from the muscles of victims may lead to better diagnosis, characterization, and eventually treatment of the disease.

Duchenne muscular dystrophy primarily affects boys, causing progressive weakness and wasting of muscle. Victims are usually confined to wheelchairs by age 12 and die from respiratory failure before reaching 30. Currently there is no treatment.

The key protein was isolated from normal human muscle tissue by a research team led by Louis M. Kunkel, associate investigator at Howard Hughes Medical Institute's Children's Hospital in Boston [*Cell*, **51**, 919 (1987)]. The protein, which the researchers named dystrophin, is completely absent from humans with Duchenne muscular dystrophy.

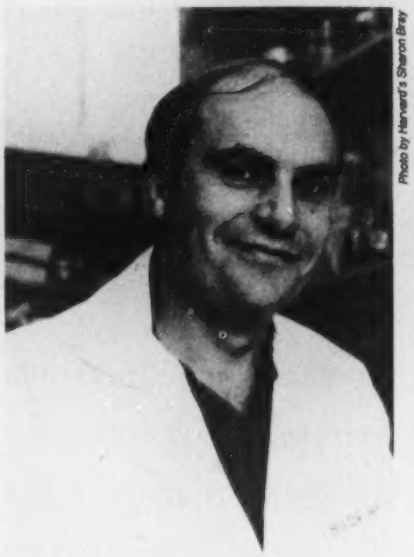

Photo by Harvard's Sharon Bray

Kunkel: led research on dystrophin

Kunkel and his coworkers from Harvard Medical School and the University of Iowa also located the site in normal muscle cells where dystrophin is found [*Nature*, **330**, 753 (1987)]. The same group previously reported that the gene that codes for dystrophin is located on the X-chromosome.

Dystrophin is a very large molecule (400,000 molecular weight) but it makes up only about 0.002% of total muscle protein. In normal individuals, dystrophin is found at triadic junctions, structures in muscle tissue where two membranes come together and information is passed from a nerve impulse to contractile muscle cells, according to Kunkel. "Possibly dystrophin serves as an anchor to hold the triadic structure in the appropriate place during contraction," he says. "Its absence might affect the normal process of transmitting signals."

Mice that have a genetic defect like Duchenne muscular dystrophy also are missing dystrophin from their muscle tissue. Kunkel points out, however, that such mice have much less muscle wasting and live normal lifespans. Discovering why the disease is so different in mice than in humans is one important research goal, Kunkel says. "The ultimate goal is to alter the course of the disease, to somehow replace the function of dystrophin," he says.

Pamela Zurer, Washington

A. H. Robins receives two new merger bids

No sooner had U.S. District Court Judge Robert R. Merhige in Richmond, Va., set A. H. Robins' liability to Dalkon Shield claimants at $2.475 billion than two suitors made new passes at the beleaguered pharmaceutical firm.

Robins already has a merger agreement worked out with the Rorer Group. However, Sanofi—France's second largest drug company—and American Home Products, which tried to buy Robins last February, both have made formal merger proposals to Robins. Other firms could also line up for takeover attempts of their own, now that the judge has essentially helped potential buyers establish Robins' value.

Judge Merhige, presiding over Robins' bankruptcy claim and financial reorganization plan, has given the company until this Wednesday to revise its plan and accept any one of the three merger proposals.

Lawyers for those claiming damages from use of Robins' Dalkon Shield intrauterine contraceptive device had suggested the judge set up a fund to settle claims that would contain $4 billion to $7 billion, but instead the judge set the $2.475 billion amount.

Paris-based Sanofi, 60% owned by the state oil firm Elf Aquitaine, has proposed to pay $500 million for a 60% stake in Robins. It also has promised to guarantee bank loans to fund the claimants' trust fund. Sanofi reported earnings of about $84 million in 1986 on sales of $2.1 billion.

American Home Products has proposed to swap $550 million of its own stock for Robins' shares. It also says it would provide cash over a maximum of seven years to fund the claimants' trust fund.

Last week, Rorer sweetened its offer for Robins. It agreed to pay Robins shareholders $482 million and added more than $700 million to its earlier offer of $1.75 billion for the compensation fund. Rorer is guaranteed a $25 million breakup fee if Robins accepts a competing bid.

Marc Reisch, New York